1. A flywheel system, comprising

a flywheel hub having an axis of rotation and a radially slotted exterior surface facing radially outwards;

an annular rim liner having an axis of rotation coinciding with said hub axis of rotation, and having an inner surface facing radially inward, said inner surface having radial projections on said rim liner that mate with said hub slots to form a torque transmitting coupling therebetween that maintains concentricity between said hub and said rim liner while allowing said rim liner to grow radially with respect to said hub; and

an annular flywheel rim on said rim liner having an axis of rotation coinciding with said rim liner axis of rotation, and having a circumferential hoop direction.

2. A flywheel system as defined in claim 1, wherein:

said rim has a modulus of elasticity $E_r$ in the hoop direction; and

said rim liner has a modulus of elasticity $E_l$ in the hoop direction that is less than or equal to said rim modulus of elasticity $E_r$.

3. A flywheel system as defined in claim 1, wherein:

said flywheel rim liner has a hoop modulus of elasticity $E_l$, and a density $\rho_l$, and a liner ratio $R_l$ equal to $E_l/\rho_l$;

said flywheel rim has a modulus of elasticity $e_r$ in said hoop direction and a density $\rho_r$; and a rim ratio $R_r$ equal to $E_r/\rho_r$

wherein $R_l$ is less than or equal to $R_r$, so said flywheel rim liner grows radially with said rim.

4. A flywheel system as defined in claim 3, wherein:

said rim liner is a polyvinyl chloride tube.

5. A flywheel system as defined in claim 1, wherein:

said projections in said rim liner are pins set in said rim liner.

6. A flywheel system as defined in claim 1, wherein:

said projections in said rim liner are splines integral with said rim liner.

7. ~~A hub for a flywheel system, comprising:~~

a flywheel hub having radial splines;

a flywheel rim liner having radial projections mating with said splines.

8. A hub for a flywheel system as defined in claim 7, wherein:

said hub splines project radially outward and extend axially along the outside surface of said hub.

9. A hub for a flywheel system as defined in claim 7, wherein:

said hub splines project radially outward and extend helically along the outside surface of said hub.

10. A process of coupling a flywheel rim to a flywheel hub, comprising:

mounting said rim on a rim liner; and

coupling said rim liner to said hub with a torque coupling liner that allows said liner to grow radially with respect to said hub while remaining concentric thereto during high speed operation.

11. A process as defined in claim 10, wherein:

said rim liner has a hoop modulus of elasticity $E_l$, and a density $\rho_l$, and a liner ratio $R_l$ equal to $E_l/\rho_l$;

said flywheel rim has a modulus of elasticity $E_r$ in said hoop direction and a density $\rho_r$; and a rim ratio $R_r$ equal to $E_r/\rho_r$

wherein $R_l$ is less than or equal to $R_r$, so said flywheel rim liner grows radially with said rim without detaching therefrom, and stays concentric to and torsionally engaged with said hub.

12. A process as defined in claim 10, wherein:

said coupling step includes engaging an array of radial projections spaced angularly around said liner in radial grooves in said hub.

13. A process as defined in claim 10, wherein:

said rim includes an inner annulus of E-glass/epoxy and an outer annulus of carbon fiber/epoxy having less material than said E-glass annulus;

whereby said carbon fiber/epoxy annulus is large enough to provide sufficient hoop strength to contain radial forces created in said rim by high speed rotation

while allowing significant radial growth of said rim away from said hub, and said rim liner maintains torque coupling and concentricity of said rim and said hub during said operation despite said radial growth.

14. A process as defined in claim 13, wherein:
said rim liner has a strain-to-failure capability of greater than 4%.

15. A flywheel system, comprising:
a hub;
a flywheel rim concentric on said hub having a carbon fiber/epoxy outer annulus and, contiguous therewith, an E-glass inner annulus with an inner circumferential surface;
a rim liner engaged with said inner circumferential surface of said inner annulus;
said rim liner being made of a material that grows radially with said rim and has sufficient strength to transmit torque between said rim and said hub during flywheel spin-up and during energy recovery from said flywheel; and
a torque coupling between said hub and said rim liner that allows said liner to grow radially with respect to said hub while remaining concentric thereto during high speed operation.

16. A flywheel system as defined in claim 17, wherein:
said coupling includes an array of radial projections spaced angularly around said liner extending into radial grooves in said hub.

17. A flywheel system as defined in claim 16, wherein:
said radial projections constitute spline teeth projecting into corresponding spline grooves in said hub.

18. A flywheel system as defined in claim 17, wherein:
said spline teeth of said liner have a Poisson's Ratio which causes said teeth to be compressed under their own centrifugal loading as said rotor is spun to high speed, causing said teeth to become wider, thereby tightening the connection between the liner teeth and hub, to help keep the rotor stable.

19. A flywheel system as defined in claim 17, wherein:

said hub has a lower radially projecting lip to provide vertical support to said rim and rim liner

20. A flywheel system as defined in claim 15, wherein:

said rim liner has a hoop modulus of elasticity $E_l$, and a density $\rho_l$, and a liner ratio $R_l$ equal to $E_l/\rho_l$;

said flywheel rim has a modulus of elasticity $E_r$ in said hoop direction and a density $\rho_r$; and a rim ratio $R_r$ equal to $E_r/\rho_r$

wherein $R_l$ is less than or equal to $R_r$, so said flywheel rim liner grows radially with said rim without detaching therefrom, and stays concentric to and torsionally engaged with said hub.